

## CLAIMS

- 1 1. A network device for use in a computer network carrying network traffic corre-  
2 sponding to sessions, the network device comprising:  
3 a traffic scheduler having one or more resources for use in forwarding network  
4 traffic received at the device at different rates;  
5 a classification engine configured to identify received network traffic based upon  
6 predefined criteria; and  
7 a resource reservation engine in communicating relationship with the traffic  
8 scheduler and the classification engine,  
9 wherein, in response to a request to reserve resources for a first data flow associ-  
10 ated with a first session group identifier (ID) and belonging to a first session, the resource  
11 reservation engine is adapted to direct the traffic scheduler to share resources reserved for  
12 one or more second data flows, each associated with a respective session group ID, with  
13 the first data flow provided that (a) the session group ID of the first data flow matches the  
14 session group ID of the one or more second data flows and (b) the one or more second  
15 data flows are not sharing resources with a third data flow having a session group ID that  
16 differs from the first session group ID.
- 1 2. The network device of claim 1 wherein the resource reservation engine includes a  
2 data structure for storing information associated with the data flows.
- 1 3. The network device of claim 2 wherein the information includes a shared field  
2 that indicates a method in which resources are shared.
- 1 4. The network device of claim 1 wherein the session group identifier associated  
2 with a given data flow includes a source address of an entity sourcing the traffic flow of  
3 the given data flow and a resource identifier (ID).
- 1 5. The network device of claim 1 wherein:

the resource reservation engine utilizes the Resource reSerVation Protocol (RSVP) specification standard; and  
the session group ID of a given data flow is contained in a RSVP Path message associated with the given data flow.

6. The network device of claim 1 wherein the first data flow and the one or more second data flows carry voice information.

7. The network device of claim 1 wherein the first data flow and the one or more second data flows originate from a single sourcing entity.

8. The network device of claim 1 wherein the first data flow and the one or more second data flows originate from a single sourcing entity and are directed to two or more different destination entities.

9. The network device of claim 1 wherein the first data flow and the one or more second data flows carry voice information and correspond to a call waiting context.

10. The network device of claim 1 wherein in response to a request to reserve resources for the first data flow that specifies sharing and a set of senders, the resource reservation engine is adapted to direct the traffic scheduler to share resources reserved for one or more second data flows that are associated with the set of senders with the first data flow provided that none of the second data flows are sharing resources with a third data flow belonging to a session that is different than the first session.

11. The network device of claim 10 wherein the set of senders is an explicit list of senders included in the request.

12. The network device of claim 10 wherein:  
the resource reservation engine is adapted to utilize the Resource reSerVation Protocol (RSVP); and

the request includes a shared object that specifies the Shared Explicit (SE) style of sharing.

13. The network device of claim 10 wherein the set of senders includes those senders associated with data flows whose destination address matches a destination address of the first data flow.

14. The network device of claim 10 wherein:  
the resource reservation engine is adapted to utilize the Resource reSerVation Protocol (RSVP); and  
the request includes a shared object that specifies the Wildcard Filter (WF) style of sharing.

15. A network device for use in a computer network carrying network traffic corresponding to sessions, the network device comprising:  
a traffic scheduler having one or more resources for use in forwarding network traffic received at the device at different rates;  
a classification engine configured to identify received network traffic based upon predefined criteria; and  
a resource reservation engine in communicating relationship with the traffic scheduler and the classification engine,  
wherein in response to a request to reserve resources for a first session wherein the request specifies sharing, the resource reservation engine is adapted to direct the traffic scheduler to share resources reserved for one or more data flows associated with a set of senders associated with the request with the first session provided that none of the data flows are sharing resources with a second session.

16. The network device of claim 15 wherein the set of senders is an explicit list of senders included in the request.

17. The network device of claim 15 wherein:

the resource reservation engine is adapted to utilize the Resource reSerVation Protocol (RSVP); and  
the request includes a shared object that specifies the Shared Explicit (SE) style of sharing.

18. The network device of claim 15 wherein the set of senders includes those senders associated with data flows whose destination address matches a destination address of the first session.

19. The network device of claim 15 wherein:  
the resource reservation engine is adapted to utilize the Resource reSerVation Protocol (RSVP); and  
the request includes a shared object that specifies the Wildcard Filter (WF) style of sharing.

20. In a computer network having a plurality of entities interconnected by a plurality of intermediate network devices having one or more resources for use in forwarding network traffic corresponding to sessions, a method for sharing resources reserved for a first data flow with a second data flow, the method comprising the steps of:

receiving a first resource reservation message associated with the first data flow, the first resource reservation message corresponding to a first session group identifier (ID);

reserving resources for use with the first data flow;

receiving a second resource reservation message associated with the second data flow, the second resource reservation message corresponding to a second session group ID;

comparing the first session group ID to the second session group ID; and

if the two session group IDs match, determining if the first data flow is sharing the resources reserved for use with the first data flow with a third data flow that has a session group ID that differs from the first session group ID and if not, sharing the resources reserved for use with the first data flow with the second data flow.

- 1 21. The method of claim 20 further comprising the step of:  
2 storing the session group ID of the first resource reservation message.
- 1 22. The method of claim 21 wherein the session group ID is stored in a data structure.
- 1 23. The method of claim 22 wherein the data structure is a table.
- 1 24. The method of claim 20 wherein the session group identifier associated with a  
2 given data flow includes a source address of an entity sourcing the traffic flow and a re-  
3 source identifier (ID).
- 1 25. The method of claim 24 wherein the first resource reservation message is a Path  
2 message in accordance with the Resource reSerVation Protocol (RSVP) specification  
3 standard that has been configured to carry the session group ID.
- 1 26. The method of claim 25 wherein the resource ID is disposed in a resource ID ob-  
2 ject of the RSVP Path message.
- 1 27. The method of claim 20 wherein the second resource reservation message is a  
2 Resv message in accordance with the Resource reSerVation Protocol (RSVP) specifica-  
3 tion standard corresponding to the second data flow.
- 1 28. In a computer network having a plurality of entities interconnected by a plurality  
2 of intermediate network devices having one or more resources for use in forwarding net-  
3 work traffic corresponding to data flows, a method for sharing resources reserved for a  
4 first data flow with a second data flow, the method comprising the steps of:  
5 receiving a first resource reservation message associated with the first data flow  
6 belonging to a first session, the first resource reservation message specifying a first ses-  
7 sion group identifier (ID);  
8 reserving resources for use with the first data flow;

9 receiving a second resource reservation message associated with the second data  
10 flow belonging to the first session wherein the second resource reservation message indi-  
11 cates sharing and specifies a set of senders associated with the request; and  
12 sharing the resources reserved for use with the first data flow with the second data  
13 flow provided that no data flow associated with the set of senders are sharing resources  
14 with a third data flow belonging to a second session.

1 29. The method of claim 28 further comprising the step of:  
2 storing the session group ID of the first resource reservation message.

1 30. The method of claim 29 wherein the session group ID is stored in a data structure.

1 31. The method of claim 30 wherein the data structure is a table.

1 32. A computer readable medium comprising computer executable instructions for  
2 performing the method recited in any one of claims 20, 21, 28 or 29.